CLAIMS

1. A method to calculate the amount of light passing through an integrated optical light guide device from a light source at an entrance to a light detector at an exit thereof, the light guide device comprising in the direction of light propagation several types of segments, each type of segments having a different refractive index profile, the refractive index profile of at least one type of segments depends on the value of an external physical or chemical quantity contacting said segment, characterized in that use is made of the refractive index depending power transfer from guided modes of light propagating from the entrance to the exit of the activable light transmitting element at one side of a transition between two adjacent segments to the guided modes propagating in the same direction at the other side of that transition; in case of sensing to determine a value of said external quantity from, and in case of intensity modulation to use said value to control; the ratio between the amount of light entering the activable light transmitting in the form of one or more guided modes and the amount of light leaving the activable light transmitting at an exit side in the form of similar guided modes.

2. A method as claimed in claim 1, wherein said light-transmitting activable element comprises a lightguide channel including an inclusion layer and/or a light-transmitting layer of an electro-optical material, wherein, in order to obtain light modulation, local segment-forming activation is introduced by means of an electrical potential difference between two electrodes patterned in an electrically conductive intermediate layer on either side of the light-transmitting channel outside the relevant mode field width.

3. A method as claimed in claim 1, wherein use is made of an inclusion layer and/or a light-transmitting layer consisting of a thermo-optical material and wherein activation is introduced by means of an electrical current driven through an electrical conducting intermediate layer to introduce a segment pattern corresponding with a predetermined pattern of segments activable by the external quantity.

4. A method as claimed in claim 1, wherein the device is provided with a channel-type lightguide and in that the activable element is provided with two segment types, the channel widths of the two segment types being adopted to each other to obtain a maximum guided mode transmission for a predetermined value of an activating quantity to be used as an operating point.

5. A method as claimed in claim 1, wherein the lightguide device is realised as a quasi-digital sensor by using a large number of succeeding segments to be transpassed by the light in order to obtain a narrow peak around an operating value in the transmission of the activable light-transmitting element as a function of the activating quantity and a transmission above a predetermined limit indicates a value of the activable parameter which is relatively close to that of the operating point, and a transmission having a value of the activable parameter which is less close to that of the operating point.

6. A method as claimed in claim 5 wherein the activating quantity is the relative humidity to be determined, to which end an activable layer comprises a material having a humidity dependent refractive index.

7. A method as claimed in claim 1, wherein the material and/or the refractive index profile of relevant types of segments are adopted to each other to enable wavelength sensitive measurements, determining the power spectrum of the light transmitted to the light transmitting element from measurements of the light emitted by the light transmitting element at different locations there along.

8. A method as claimed in claim 1, wherein said activable light transmitting element contains two types of segments S1 and S2, wherein S1 is activated by a quantity A and S2 is activated by a quantity B different from quantity A and wherein S1 and S2 are incorporated in a feedback circuit generating, based on the criterion of a constant transmission by the activable light transmitting element, the refractive index profile of S2 is maintained at a value equal to

that of the refractive index profile of S1 by applying a suitable value B, to correlate the quantity A with a set value of quantity B.

9. An integrated optical lightguide device fitted with an activable light transmitting element to be provided with at an entrance side a light source and at an exit side a light detector and, seen in a direction of the light propagation, provided with several types of segments, each type of segments having a different refractive index profile, wherein the refractive index profile of one or more types of activable segments depends on the value of said external quantity, said several types of segments being organized to carry out a method as claimed in anyone of the preceding claims.

10. An integrated optical lightguide as claimed in claim 9, wherein said activable light transmitting element contains two types of segments and wherein the formation of segments is realised by means of local physical or chemical treatment of an inclusion layer originally consisting of a material activable by said external quantity.

11. An integrated optical lightguide as claimed in claim 9, wherein said activable light-transmitting element includes a segmented, strip-loaded type channel lightguide, wherein both the channel formation and the formation of segments is realised by local physical treatment of an originally uniformly applied, homogeneously activable inclusion layer.

12. An integrated optical lightguide device as claimed in claim 9, wherein an inclusion layer and/or a light-transmitting layer consists of an electro-optical material and wherein local, segment-forming activation is realised by means of an electrical potential difference between a first electrically conducting layer, being present on a first side of said electro-optical layer, and a second electrically conducting layer being present at an opposite side of the first side, said electro-optical layer, in which an electrode pattern is formed corresponding to an intended segment pattern.